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- c) removing nonhybridized nucleic acid probe molecules;
  - d) separating the hybridized nucleic acid probe molecules without using formamide and
  - e) detecting the separated nucleic acid probe molecules.
2. A method according to Claim 1, wherein the separated nucleic acid probe molecules in step e) are also quantified.
3. (AMENDED) A method according to Claim 1[ or 2], wherein the separation solution used in step d) is selected from the group consisting of water, buffered water, DMSO and SSC.
4. A method according to Claim 3, wherein the separation solution is 0.001 - 1.0 M Tris/HCl, pH 9.0 +/- 2.0.
5. (AMENDED) A method according to Claim 3[ or 4], wherein the separation solution is 0.01 M Tris/HCl, pH 9.0 +/- 2.0.
6. (AMENDED) A method according to [one of the preceding claims] Claim 1, wherein step d) is carried out at a temperature of 50 to 100 °C.
7. (AMENDED) A method according to [one of the preceding claims] Claim 1, wherein step d) is carried out at a temperature lower than 100 °C.
8. (AMENDED) A method according to [one of the preceding claims] Claim 1, wherein step d) is carried out at a temperature of approximately 80 °C.
9. (AMENDED) A method according to [one of the preceding claims] Claim 1, wherein the nucleic acid probe is complementary to a chromosomal or episomal DNA, an mRNA or rRNA of a microorganism to be detected.

10. (AMENDED) A method according to [one of the preceding claims] Claim 1, wherein the nucleic acid probe is covalently bonded to a detectable marker.
11. A method according to Claim 10, wherein the detectable marker is selected from the group of the following markers:
  - a) fluorescence markers,
  - b) chemoluminescence markers,
  - c) radioactive markers,
  - d) enzymatically active group,
  - e) haptene,
  - f) nucleic acid detectable by hybridization.
12. (AMENDED) A method according to [one of the preceding claims] Claim 1, wherein the microorganism is a single-cell microorganism.
13. (AMENDED) A method according to [one of the preceding claims] Claim 1, wherein the microorganism is a yeast, a bacterium, an alga or a fungus.
14. A method according to Claim 13, wherein the microorganism belongs to the genus *Salmonella*.
15. (AMENDED) A method according to [one of the preceding claims] Claim 1, wherein the sample is an environmental sample taken from water, soil or air.
16. (AMENDED) A method according to [one of Claims 1 through 14] Claim 1, wherein the sample is a food sample.
17. A method according to Claim 16, wherein the sample is taken from milk or milk products, drinking water, beverage, baked products or meat products.

18. (AMENDED) A method according to [one of Claims 1 through 14] Claim 1, wherein the sample is a medicinal sample.

19. A method according to Claim 18, wherein the sample is taken from tissue, secretions or fecal matter.

20. (AMENDED) A method according to [one of Claims 1 through 14] Claim 1, wherein the sample is taken from wastewater.

21. A method according to Claim 20, wherein the sample is taken from activated sludge, putrefactive sludge or anaerobic sludge.

22. (AMENDED) A method according to [one of Claims 1 through 14] Claim 1, wherein the sample is taken from a biofilm.

23. A method according to Claim 22, wherein the biofilm is taken from an industrial plant, is formed in purification of wastewater or is a naturally occurring biofilm.

24. (AMENDED) A method according to [one of Claims 1 through 14] Claim 1, wherein the sample is taken from a pharmaceutical or cosmetic product.

25. (AMENDED) A kit for carrying out the method according to [one of the preceding claims] Claim 1, containing

- a) at least hybridization buffer,
- b) at least one nucleic acid probe,
  - b1) for specific detection of a microorganism,
  - b2) for performing a negative control.

26. A kit according to Claim 25, containing at least one specific probe for detection of bacteria of the genus Salmonella.

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